

REMARKS

Claims 1-27 are currently pending in the application. Claims 5, 6, 9, 11, and 24-27 are withdrawn from consideration.

Claims 1, 4, 7, 12, 13, 14, and 17 have been amended to replace the word "fluoropolymer" with the word "fluoroplastic." Fluoroplastics represent a distinct class of fluoropolymers, as shown, for example, in Grootaert, U.S. 5,285,002, a copy of which is attached for the convenience of the Examiner. Support for this amendment is found, for example, in the Background section of the present application, which establishes that the invention is directed towards plastic orthodontic articles with improved stain resistance. Moreover, the particular plastics described in the application as being useful for this purpose are all classified as fluoroplastics.

Claims 1-4, 7, 8, 10, and 12-23 stand rejected under 35 U.S.C. 112, first paragraph, on the ground that the specification, while being enabling for specified fluoropolymers and amounts thereof, does not reasonably provide enablement for the multiplicity of polymers and amounts thereof within the claims. Applicants request that the Examiner reconsider and withdraw the rejection for the following reasons.

First, applicants note that claims 1, 4, 7, 12-14, and 17 have been amended to replace the word "fluoropolymer" with the word "fluoroplastic." Thus, the claims do not cover every conceivable type of fluorinated polymer. For example, the claims do not cover polymers that are fluoroelastomers. In addition, the detailed description provides several examples of suitable fluoroplastics for use in the invention: perfluoroethylene-propylene copolymer, perfluoroalkoxyethylene, ethylene-tetrafluoroethylene copolymer, polyvinylidene fluoride, polyvinyl fluoride, polychlorotrifluoroethylene, and ethylene-chlorotrifluoroethylene copolymer (page 6, line 9 - page 7, line 2). Commercial sources for these materials are also provided. Furthermore, a set of test procedures is provided to help assist in the selection of an appropriate fluoroplastic for making the orthodontic article. The test procedures provide methods for assaying the stain resistance and transmittance levels of a material. Finally, numerous examples are provided to demonstrate how the described fluoroplastics could be selected, prepared, and tested. The specification, therefore, provides sufficient information so that a person of ordinary skill in the orthodontics field could make the orthodontic articles of the current invention.

Accordingly, the claims satisfy the enablement requirement and the rejection should be withdrawn.

Claims 17-19 stand rejected under 35 U.S.C. 102(b) as being anticipated by Hammar et al., U.S. 5,461,133. The Examiner states that Hammar teaches orthodontic articles comprising the same fluoropolymers as described by the applicants. Hammar teaches elastomeric orthodontic devices comprising **fluoroelastomers**, including fluorocarbon, fluorosilicone, and fluoroalkoxyphosphazene elastomers. Hammar lists three types of fluorocarbon elastomers, in particular: poly(vinylidene fluoride-co-hexafluoropropylene), poly(vinylidene fluoride-co-hexafluoropropene-co-tetrafluoroethylene), and poly(vinylidene fluoride-co-hexafluoropropylene-co-tetrafluoroethylene).

Claims 17-19, in contrast, require the following fluoroplastics: perfluoroethylene-propylene copolymer, perfluoroalkoxyethylene, ethylene-tetrafluoroethylene copolymer, polyvinylidenefluoride, polyvinylfluoride, polychlorotrifluoroethylene, and ethylene-chlorotrifluoroethylene copolymer. None of these fluoroplastics is described in Hammar. Accordingly, Hammar does not anticipate the claims, and the rejection should be withdrawn.

Claims 1-4, 7, 8, 10, and 12-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hammar et al., U.S. 5,461,133, taken with Pustka, U.S. 4,323, 956. The Examiner states that Hammar teaches using the present fluoropolymers in orthodontic articles because of their physical properties, stain resistance, and aesthetics (column 5, line 58- column 6, line 37). The Examiner's statement, however, is incorrect.

Hammar teaches the use of stain-resistant **fluoroelastomers** for making elastomeric orthodontic devices, such as force modules. These force modules have a resilient force in tension or compression that can be used to move a tooth or an orthodontic appliance relative to other teeth or orthodontic appliances (Hammar, column 2, lines 37-39). In contrast, the claims require non-elastomeric **fluoroplastics** for making relatively rigid orthodontic articles, such as orthodontic brackets. As noted above and illustrated in the Grootaert patent, fluoroplastics and fluoroelastomers represent two different and distinct classes of polymers. Fluoroplastics are suitable for making the orthodontic articles of the present invention because they combine the mechanical and aesthetic properties of ceramics with good stain resistance. The

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fluoroelastomers described in Hammar, on the other hand, have very different properties and are useful in different applications. Hammar teaches nothing regarding fluoroplastics.

Pustka, the secondary reference, does describe a number of polymers that would be classified as fluoroplastics. However, Pustka describes using these materials in light fixture windows and lenses—applications completely unrelated to orthodontics. A person of ordinary skill in the orthodontics field, looking for a material that would combine the mechanical and aesthetic properties of ceramics with good stain resistance in a rigid orthodontic article such as a bracket, would not have looked to Pustka to find suitable materials. Pustka, therefore, is not properly combinable with Hammar. Accordingly, the claimed invention would not have been obvious over the cited references, and the rejection should be withdrawn.

Attached is a marked-up version of the changes being made by the current amendment.

Applicant asks that all claims be allowed. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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Version with markings to show changes made

In the claims:

Claims 1, 4, 7, 12-14, and 17 have been amended as follows:

1. An orthodontic article comprising a fluoroplastic [fluoropolymer], said article exhibiting at least about 0.001% transmittance at 546 nm when measured according to the Transmittance Test Procedure.

4. The article of claim 1, wherein said fluoroplastic [fluoropolymer] is selected from the group consisting of perfluoroethylene-propylene copolymer, perfluoroalkoxyethylene, ethylene-tetrafluoroethylene copolymer, polyvinylidene fluoride, polyvinyl fluoride, polychlorotrifluoroethylene, ethylene-chlorotrifluoroethylene copolymer, or a combination thereof.

7. The article of claim 1, wherein said fluoroplastic [fluoropolymer] comprises ethylene-chlorotrifluoroethylene copolymer.

12. A method for using an orthodontic bracket, said method comprising:
contacting a fluoroplastic [fluoropolymeric] orthodontic bracket having an average transmittance of at least 0.001% when measured according to the Transmittance Test Method with a composition comprising an organoborane compound; and
adhering said bracket to a tooth.

13. The method of claim 12, wherein said fluoroplastic [fluoropolymeric] orthodontic bracket exhibits a Delta E color shift of no greater than about 2 when tested according to the Hydrophilic Color Shift Test, and a Delta E color shift of no greater than about 5 when tested according to the Oleophilic Color Shift Test.

14. The method of claim 12, wherein said fluoroplastic [fluoropolymeric] article comprises a fluoroplastic [fluoropolymer] selected from the group consisting of perfluoroethylene-propylene copolymer, perfluoroalkoxyethylene, ethylene-tetrafluoroethylene copolymer, polyvinylidene fluoride, polychlorotrifluoroethylene, ethylene-chlorotrifluoroethylene copolymer, or a combination thereof.

17. An orthodontic article comprising a fluoroplastic [fluoropolymer] selected from the group consisting of perfluoroethylene-propylene copolymer, perfluoroalkoxyethylene, ethylene-tetrafluoroethylene copolymer, polyvinylidene fluoride, polyvinyl fluoride, polychlorotrifluoroethylene, ethylene-chlorotrifluoroethylene copolymer, or a combination thereof.